R EXD.

Vol. 89. Part 5. Pp. 63-78, 1 pl., 23 figs. 15th June, 1939

INST. ENT.
LIBRARY
15 JUN 1939
En. 344
ERIAL
EPARATE

THE

TRANSACTIONS

OF THE

ROYAL ENTOMOLOGICAL SOCIETY

OF

LONDON

World List abbreviation: *Trans. R. ent. Soc. Lond.*

CONTENTS

PAGE

CORBET, A. Steven, D.Sc., Ph.D., F.I.C. A revision of the Malayan species of *Allotinus* Felder & Felder (Lepidoptera: LYCAENIDAE) 63–78, 1 pl., 23 figs.

LONDON:
PUBLISHED BY THE SOCIETY AND
SOLD AT ITS ROOMS, 41, QUEEN'S GATE, S.W.7

Price 4s. 6d.

THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

Founded, 1833. Incorporated by Royal Charter, 1885.

PATRON—HIS MAJESTY THE KING.

OFFICERS and COUNCIL for the SESSION 1939–1940.

J. C. F. Fryer, O.B.E., M.A., *President.*

E. A. Cockayne, M.A., M.D., F.R.C.P.
Francis Hemming, C.M.G., C.B.E.
V. B. Wigglesworth, M.A., B.Ch., M.D. } *Vice-Presidents.*

N. D. Riley, *Treasurer.*

O. W. Richards, M.A., D.Sc., *Secretary.*

F. J. Griffin, A.L.A., *Registrar.*

Other Members of Council.

H. M. Edelsten.
C. N. Hawkins.
B. M. Hobby, M.A., D.Phil.
Col. F. A. Labouchere.
Hugh Main, B.Sc.
Sir Guy A. K. Marshall, C.M.G., D.Sc., F.R.S.
A. M. Massee, D.Sc.
The Hon. Miriam Rothschild.
W. R. Thompson, Ph.D., D.Sc., F.R.S.
B. P. Uvarov, D.Sc.
A. Welti.

Trustees of the Society.

R. W. Lloyd.
Sir Edward B. Poulton, F.R.S.

Finance and House Committee.

Francis Hemming, C.M.G., C.B.E. (Chairman).
Brig.-Gen. B. H. Cooke, C.M.G., C.B.E., D.S.O.
H. Willoughby Ellis, M.I.E.E.
G. Fox-Wilson.
R. W. Lloyd.
A. Welti.

Publication Committee.

W. R. Thompson, Ph.D., D.Sc., F.R.S. (Chairman).
M. Burr, D.Sc., F.G.S., A.R.S.M.
E. A. Cockayne, M.A., M.D., F.R.C.P.
B. M. Hobby, M.A., D.Phil.
A. M. Massee, D.Sc.
Hugh Scott, M.A., Sc.D.

Library Committee.

B. P. Uvarov, D.Sc. (Chairman).
R. B. Benson, M.A.
K. G. Blair, D.Sc.
H. M. Edelsten.
R. W. Lloyd.
W. H. T. Tams.

Committee for the Protection of British Insects.

W. G. Sheldon (Chairman).
Capt. E. Bagwell-Purefoy.
C. L. Collenette.
W. J. Dow.
J. C. F. Fryer, O.B.E., M.A.
Col. F. A. Labouchere.
N. D. Riley.
H. M. Edelsten (Secretary).

The Executive Officers of the Society are *ex-officio* members of all Committees.

DELEGATES OF THE SOCIETY TO:

1. **British National Committee for Biology** (Royal Society).
   Sir Thomas Hudson Beare, LL.D., F.R.S.E., appointed 1933.
   Dr. Karl Jordan, F.R.S., appointed 1936.
2. **Conference of Delegates of Corresponding Societies of the British Association for the Advancement of Science.**
   D. W. H. Thorpe, appointed 1938.
3. **International Congress of Entomology** (Berlin 1938).
   J. C. F. Fryer, O.B.E., M.A. *Francis Hemming, C.M.G., C.B.E.*
   A. D. Imms, M.A., Sc.D., F.R.S.
4. **Local Committee of Management of Wicken Fen.**
   Mr. H. M. Edelsten. *Mr. E. C. Bedwell.*
   [Delegates nominated by Committee for the Protection of British Insects.]
5. **National Trust for Places of Historic Interest or Natural Beauty.**
   Mr. W. G. Sheldon, appointed 1922.
6. **New Forest Association.**
   Mr. W. Fassnidge, appointed 1934.
7. **Royal Meteorological Society. Phenological Committee.**
   Dr. C. B. Williams, appointed 1937.

A REVISION OF THE MALAYAN SPECIES OF *ALLOTINUS* FELDER & FELDER (LEPIDOPTERA: LYCAENIDAE)

By A. Steven Corbet, D.Sc., Ph.D., F.I.C.

With 1 Plate and 23 Figures.

(Read 1st March, 1939.)

Fruhstorfer's revision of the genus *Allotinus* (1913, *Z. wiss. InsektBiol.* **9**: 342 *et seq.*; 1914, **10**: 20 *et seq.*) formed the basis of his monograph in Seitz (1916, *Grossschmett. Erde* **9**: 808–815). In most respects, Fruhstorfer's work on this intricate genus is sound, but I have been unable to separate the *A. unicolor* complex into the constituent forms recognised by Fruhstorfer on the basis of facies and male genitalia. In the present paper, the genus has been revised in the light of the results obtained from a study of the male genitalia.

The *Allotinus* species are subject to considerable variation, both individual and geographical. To a certain extent, each sub-region has its own type of facies, and most of the Malaysian species do not extend into other sub-regions, although, of course, a certain amount of infiltration, in both directions, has taken place at the Burmese–Siamese–Malayan frontiers. The male sex stripe on the fore-wing is usually a good specific character, although it varies somewhat according to locality. The intensity of the striations on the underside varies in the usual manner in Malaysia; Javanese examples are lighter than Sumatran specimens which, in turn, are lighter than the Malayan and Bornean representatives. The underside markings are usually more strongly contrasted in Sumatran races compared with the duller and more uniform appearance of examples from Malaya and Borneo.

In the Malay Peninsula, the *Allotinus* species are mostly found in the primeval forest and *A. panormis* alone appears to be confined to the hills above 3000 feet. It was my experience that, while representatives of the genus were rather rare, some species could usually be found in a few favoured localities, and they persisted in such spots over a period of years. It was difficult to obtain numbers and I never collected more than 6 specimens at one place on a single occasion: the butterflies were often seen in flight after 3 p.m. The feeble flight of the *Allotinus* species and the marked tendency to form isolated colonies might be expected to favour the development of local races, and the occurrence of a curious form of *A. horsfieldi* at Lombong in Johore and the presence of a distinctive variety of *A. unicolor* on Singapore Island may be explicable along these lines.

Examination of the male genitalia.

The male genitalia of the sub-family Miletinae are characterised by the large, paired uncus plates, each with a long ventral hook, and the comparatively small claspers and aedeagus. The design of the clasper and, to a lesser extent, of the uncus plate differs from one species to another. In the *A. unicolor* complex, there is a considerable degree of variability in the contour of the uncus plate and, although there is a tendency for the dorsal edge to be more

deeply excavated in smaller specimens, differences in the shape of the uncus do not appear to correspond to differences in the facies. The contour of the aedeagus may appear different according to whether this organ is viewed dorsally or laterally, and due weight must be given to this point when using the figures in this paper.

Allotinus Feld. & Feld.

Allotinus Felder & Felder, 1865, *Reise Novara Rhopal.*: 285. Type (fixed by Scudder, 1875) = *Allotinus fallax* Feld. & Feld., 1865.
Paragerydus Distant, 1884, *Rhop. Malay.*: 207. Type (fixed by de Nicéville, 1890) = *Miletus horsfieldi* Mre., 1857.

Key for the Separation of the Malaysian Species.

After the specific names are given the wing expanses in mm. of the Malayan representatives, but the figures after *fallax*, *parapus*, *nicholsi*, *moorei* and *apries* refer to the Bornean forms and Sumatran measurements are given with *paetus*.

1(7). ♂ upF without a pale patch of specialised scales and basal portion of vein 4 not thickened. UpF in both sexes with greyish-blue or white area on dark brown ground (except *nicholsi*).

fallax group.

2(3). UpF with basal area broadly greyish-blue. *subviolaceus* (♂ 21–31, ♀ 24–31).
3(6). UpF with white area. Un white, densely striated with reddish-brown.
4(5). UpF cell mostly dark brown; upH with white discal area. UnF post-discal band streak-like, irregular and completely broken at vein 4 *fallax* (♂ 32–34, ♀ 30–31).
5. UpF cell entirely white; upH entirely pale greyish-brown. UnF with large area near inner margin almost unspotted; post-discal band comprising broad, oval, reddish-brown spots, more or less regular and only slightly broken at vein 4 . . . . *parapus* (♂ 34, ♀ 31).
6. Up dark reddish-brown, as in *nivalis*. Un pale reddish-grey, densely striated with pale reddish-brown; the usual markings of the *horsfieldi* group can be faintly discerned, un resembling a poorly marked *subviolaceus*. ♀ unknown . . . . . *nicholsi* (♂ 23).
7. ♂ upF with a pale patch of specialised scales and basal portion of vein 4 thickened. Up in both sexes unicoloured dark brown.
8(26). Un termens and F apex not darkened. Un without black submarginal dots which are outwardly whitened.

horsfieldi group.

9(10). UnH with prominent black spot at mid costa . *nivalis* (♂ 16–21, ♀ 19–21).
10. UnH with spot at mid costa not more prominent than the others. Un more or less densely striated and the following series of markings can usually be distinguished: two cell spots and a more prominent cell-end spot on each wing, two or three costal spots in the basal half of H, a series of post-discal spots forming an irregular band on both wings (the spot in space 6 on H moved inwards), and a series of interneural submarginal spots.
11(20). UnF post-discal fascia not broken or sharply angled at vein 4. UnH post-discal spot in space 6 moved inwards and placed mid-way between spot in space 7 and cell-end spot.
12(19). Un striations normal. H toothed.

13(14). Un pure white, with dark brown markings. Un post-discal fascia bent at vein 4 on F and spots coalesced; unH spot at middle of space 7 very large. ♂ F apex rounded; brand medium length (5 × 1 mm.), rather lentiform and pale . . *paetus* (♂ 29–37, ♀ 27–35).

14. Un very pale reddish-white with reddish-brown or darker brown markings. ♂ F apex rather blunt.

15(16). Un sparsely striated and post-discal spots rather rounded. ♂ brand oval, short, relatively broad (4 × 2 mm.), and outline diffuse *moorei* (♂ 36·5, ♀ 33).

16. Un more densely striated, with post-discal spots elongated or triangular. ♂ brand pale and rectangular.

17(18). Up dark reddish-brown. ♂ brand (4 × 1 mm.) prominent and regularly defined. Un markings dark brown or dark reddish-brown, post-discal fasciae usually consisting of separated spots *unicolor* (♂ 21–35, ♀ 22–32).

18. Up pale brown. ♂ brand (2 × 0·75 mm.) obscure and more diffuse. Un markings paler and fainter, post-discal fasciae comprising narrow conjoined spots and almost linear . . *dilutus* (♂ 21·5–23, ♀ 18–22).

19. Un with dense reddish-brown striations and prominent elongated submarginal streaks. Un post-discal spots rounded and rather obscure. UnF post-discal fascia forming an even curve, turned inwards in the lower third of the wing. ♂ brand longer, slightly broader and more diffuse than in *horsfieldi*. H teeth hardly visible in both sexes *apries* (♂ 34–40, ♀ 34–36).

20. UnF post-discal fascia sharply angled or broken at vein 4 and upper portion oblique, the fascia comprising rather broad and conjoined streaks. UnH with post-discal spot in space 6 close to, or contiguous with, the spot in space 7 (Malayan subspecies only). ♂ brand long, broad, oval and rather pale.

21(23). ♂ H not toothed. ♀ un ground colour almost white.

22. ♂ tip of uncus blunt. ♀ unF post-discal spot in space 3 very oblique and moved inwards . . . . *continentalis* (♂ 29–37, ♀ 29–35).

23. ♂ H toothed. ♀ un ground colour pale reddish-white.

24(25). ♂ tip of uncus rostriform. UnF post-discal band bent or broken at vein 4 but not divided into three oblique stripes *horsfieldi* (♂ 24–40, ♀ 21–35).

25. ♂ tip of uncus blunt. UnF post-discal band broken at veins 2 and 4 to form three oblique stripes . . . *leogoron* (♂ 25–33, ♀ 24–30).

26. Un termens and F apex distinctly darkened. Un both wings with a series of black, interneural, submarginal dots which are outwardly whitened.

fabius group.

27(28). Un post-discal markings above vein 4 on F and above vein 6 on H coalesced to form bands, extending almost to the termens. Un pale reddish-white in ♂, white in ♀, with strongly contrasted reddish-brown markings. ♂ brand long, narrow, rather obscure and only slightly paler than the ground. ♀ H strongly caudate at vein 4, and tornal area sometimes white . . . *fabius* (♂ 25–32, ♀ 31–35).

28. Un post-discal markings normal.

29(31). ♂ un ground colour pale reddish-grey, all markings faint, and ground colour gradually darkening towards F apex.

30. ♂ F apex pointed; brand medium length, broad (5 × 1·5 mm.), lenticular, rather diffuse and slightly paler than the ground. ♀ un as in ♂, but F apex only slightly darkened: post-discal fasciae rather faint but comprising linear streaks more or less in line on F. ♀ H not caudate at vein 4 . . . . . *taras* (♂ 29–30, ♀ 28–31).

31. ♂ un ground colour dark reddish-brown, deepening towards termens of both wings; black submarginal dots rather obscure in *panormis*, prominent in *strigatus* and *borneensis*.

32(33). ♂ F apex rounded; brand long, rather narrow (6·5 × 1 mm.), diffuse and hardly paler than the ground. ♂ un post-discal fasciae very obscure. ♀ very like *taras* ♀, but un whiter, striations finer, and denser at F apex, and post-discal fasciae more obscure. ♀ H not caudate at vein 4 . . . . *panormis* (♂ 31–38, ♀ 31–34).

33(34). ♂ brand short, broad (3 × 1·5 mm.), distal edge diffuse and paler than the ground. Un both sexes with an ochreous tinge and striations evenly distributed; post-discal bands prominent, comprising series of irregular streaks, with the streaks in spaces 4 and 5 on F moved out towards the termen. ♀ H not caudate *strigatus* (♂ 31–36, ♀ 27–34).

34. ♂ brand very long, rather broad, diffuse and whitish, extending almost to termen. Un both sexes striations denser towards distal margins and post-discal fasciae very obscure. H both sexes bluntly crenulate, and strongly caudate at vein 4 in ♀. *borneensis* (♂ 37, ♀ 35–39).

Allotinus subviolaceus alkamah Dist.

Allotinus subviolaceus Felder & Felder, 1865, *Reise Novara Rhopal.*: 286, pl. xxxv, f. 27 & 28 ♂; Java.
Allotinus alkamah Distant, 1886, *Rhop. Malay.*: 452, pl. xliv, f. 3 ♂; ♂♀, Malay Peninsula.
Allotinus subviolaceus alkamah Fruhstorfer, 1916, *in* Seitz, *Grossschmett. Erde* **9**: 808, pl. 141 g 6 ♀.

Throughout the range of the species, females appear to be more abundant than males. Burmese and Sumatran examples are referable to *alkamah*; other Malaysian subspecies are *silarus* Fruh., Borneo, and *mirus* van Eecke, Simalur. The Javanese form is figured in Piepers and Snellen, 1918, *Rhop. Java*, pl. xx, f. 20a ♂, b ♀.

Allotinus fallax Feld. & Feld.

Allotinus fallax Felder & Felder, 1865, *Reise Novara Rhopal.*: 285, pl. xxxv, f. 24 ♂, 25 & 26 ♀; Luzon.

This species, which is very rare in Malaysia, occurs in the more easterly parts of the Archipelago in a number of very distinct subspecies. The conspecificity of Bornean [1] *audax* H. H. Drc. with *fallax* has been confirmed by examination of the male genitalia and there can be little doubt that Sumatran [2] *apus* Nic., of which only a single female is known, is a further well-differentiated subspecies. In *apus* the hind-wing is distinctly caudate at vein 4, while it is only slightly so in *audax* female.

Allotinus parapus Fruh.

Allotinus parapus Fruhstorfer, 1913, *Z. wiss. InsektBiol.* **9**: 343; ♂, North Borneo. Figured in Seitz, pl. 141 h 7 ♂.

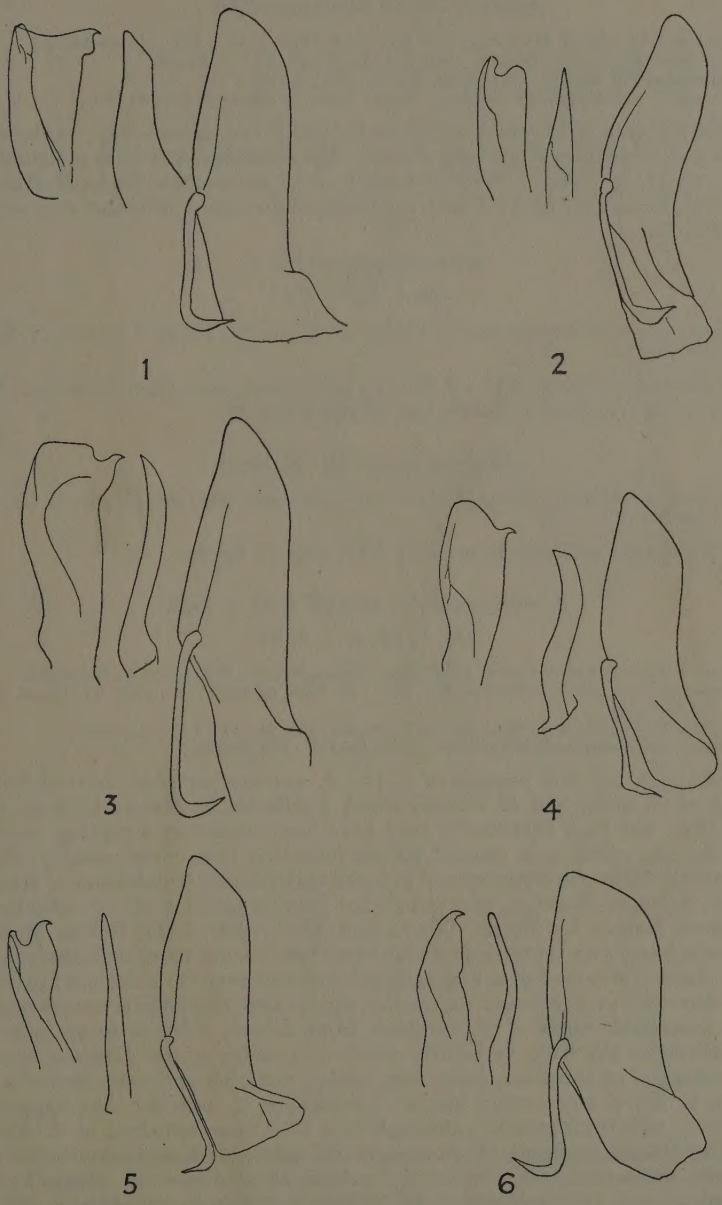
Not known outside of Borneo.

Allotinus nicholsi Moult.

Allotinus nicholsi Moulton, 1912, *J. Straits Br. roy. Asiat. Soc.* **6**: 83; ♂, Sarawak.

Only the type specimen known.

[1] *Allotinus audax* H. H. Druce, 1895, *Proc. zool. Soc. Lond.* **1895**: 564, pl. xxxi, f. 11 ♂, 12 ♀: Kina Balu.
[2] *Allotinus apus* de Nicéville, 1895, *J. Bombay nat. Hist. Soc.* **10**: 27, pl. P, f. 17 ♀; North-east Sumatra.



FIGS. 1–6.—Male clasper, aedeagus and uncus of (1) *Allotinus punctatus* (Semp.), Philippines, Davao; (2) *A. taras taras* (Doh.), Malaya; (3) *A. borneensis borneensis* Moult., Borneo; (4) *A. fabius arrius* Fruh., Malaya; (5) *A. strigatus strigatus* Moult., Borneo, holotype; (6) *A. fallax audax* H. H. Drc., Borneo.

Allotinus nivalis substrigosa (Mre.).

Miletus nivalis H. Druce, 1873, *Proc. zool. Soc. Lond.* **1873**: 348; ♀ *nec* ♂, North Borneo.
Logania substrigosa Moore, 1884, *J. Asiat. Soc. Bengal.* **53**: 22; ♀, Mergui.
Paragerydus nivalis Distant, 1884, *Rhop. Malay.*: 207, pl. xxii, f. 11.
Allotinus nivalis substrigosa Fruhstorfer, 1916, *in* Seitz, *Grossschmett. Erde* **9**: 810.

The Malayan form, which occurs on the plains and, more rarely, on the hills, is not separable from *substrigosa* (Mre.). The nominotypical form is figured in Seitz, pl. 141 g 3 und. Other Malaysian races are *megaris* Fruh., North-east Sumatra, and *lenaia* Fruh., Nias: according to Toxopeus, a further race occurs in Java.

Allotinus paetus (Nic.).

(pl. 1, fig. 1, ♂.)

Paragerydus paetus de Nicéville, 1895, *J. Bombay nat. Hist. Soc.* **9**: 269, pl. O, f. 12 ♂; ♂♀, North-east Sumatra.

Figured in Seitz, pl. 141 i 2 ♀ und., and known only from Sumatra. The male genital armature resembles that shown in fig. 19.

Allotinus moorei (H. H. Drc.).

Paragerydus moorei H. H. Druce, 1895, *Proc. zool. Soc. Lond.* **1895**: 562, pl. xxxi, f. 5 ♂, 6 ♀; Kina Balu.

This species is known to me only from Druce's figures.

Allotinus unicolor unicolor Feld. & Feld.

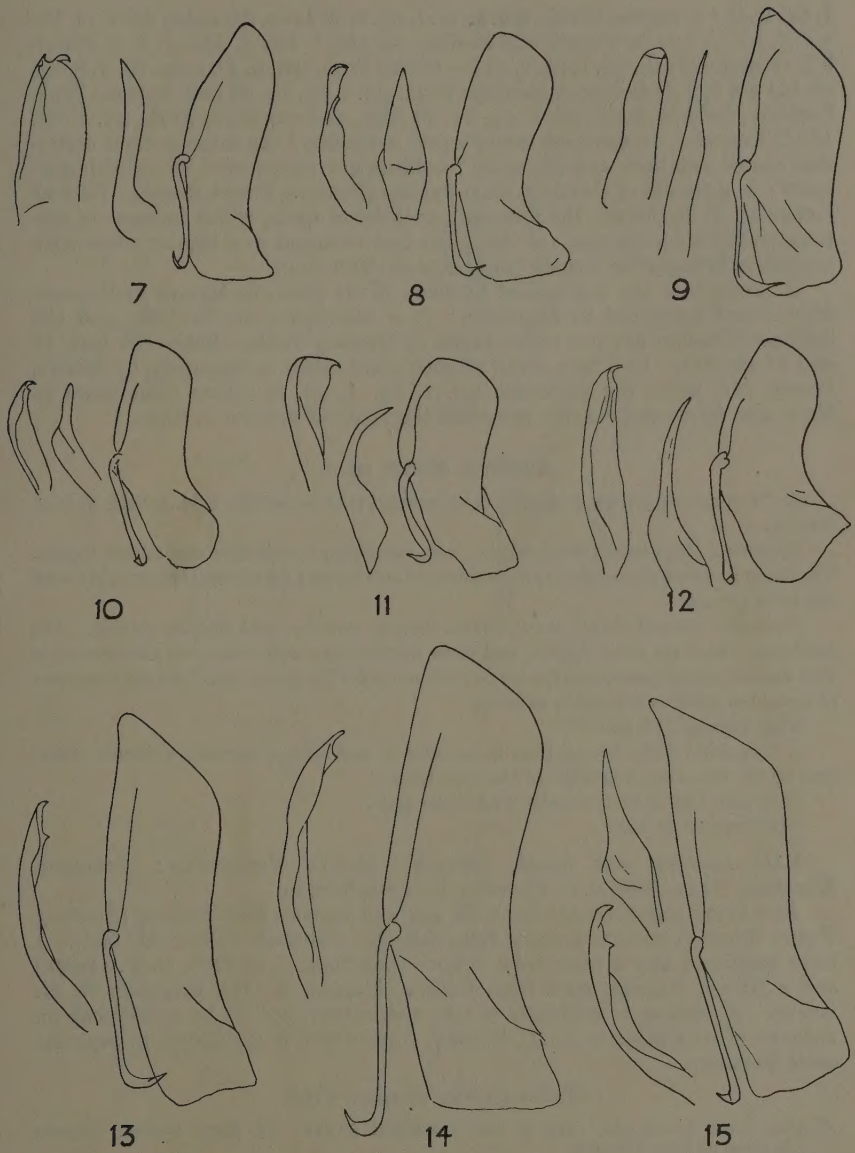
(pl. 1, fig. 4, ♂, 3, ♀).

Allotinus unicolor Felder & Felder, 1865, *Reise Novara Rhopal.*: 286; ♀ *nec* ♂, Singapore.
Allotinus unicolor unicolor Fruhstorfer, 1916, *in* Seitz, *Grossschmett. Erde* **9**: 810, pl. 141 i 7 ♂ und.
Allotinus aphocha aphocha Fruhstorfer, 1916, *tom. cit.*: 810, pl. 141 g 4 ♀, 5 ♂ (*partim*).
Allotinus posidion myriandus Fruhstorfer, 1916, *tom. cit.*: 811 (*partim*).

Although my first impression of the *A. unicolor* complex, derived from a study of 22 males and 46 females which I collected in Malaya between 1927 and 1932, was that Fruhstorfer may have been correct in regarding *unicolor*, *aphocha* and *posidion* as distinct species (and that there were possibly one or two more), further investigation of my own material, of 16 males and 33 females in the Selangor Museum, of a somewhat smaller series recently collected in southern Malaya by Messrs. Cowan and Eliot, and of the British Museum material has shown that it is probable that there are not more than two species. One of these, *A. unicolor*, is widely distributed and very variable, and the other, now described as *A. dilutus*, is a smaller, much rarer, and more constant species. The remarkable series of *A. horsfieldi* from Johore, referred to on page 73, demonstrates the wide variability which is possible in an *Allotinus* species. Examination of antennae, palpi, legs, scales, venation and male genitalia has failed to reveal any certain means of separating *A. unicolor* into component forms on structural grounds, although vein 12 is more upturned in *A. dilutus*.

The Malaysian forms of *A. unicolor* do not exhibit any remarkable subspecific differences, other than the rather paler underside shown by the Sumatran and Javanese races. In Malaya and Borneo, the species exhibits an astonishing variability in size.

The Burmese subspecies is *atacinus* Fruh. (pl. 1, fig. 2, ♀) and the Malaysian races are *myriandus* Fruh. (pl. 1, fig. 5, ♂, 6, ♀), Sumatra, *posidion* Fruh. (pl.



FIGS. 7–15.—7–12. Male clasper, aedeagus and uncus of (7) *A. panormis fruhstorferi* subsp. n., Malaya; (8) *A. parapus* Fruh., Borneo, holotype; (9) *A. subviolaceus alkamah* Dist., Malaya; (10) *A. nivalis substrigosa* (Mre.), Malaya; (11) *A. nicholsi* Moult., Borneo, holotype; (12) *A. apries eupalion* Fruh., Sumatra, holotype. 13–15. Male clasper and uncus of (13) *Allotinus continentalis vadosus* subsp. n., Malaya; (14) *A. macassariensis* (Holl.), Celebes, Minahassa; (15) *A. horsfieldi nessus* subsp. n., Malaya.

1, fig. 1, ♂), (= *enatheus* Fruh. **syn. n.** pl. 1, fig. 8, ♀) Java, figured in Seitz, pl. 141 g 8 ♂, h 1 ♀, and in Piepers and Snellen, pl. xix, f. 13a ♂, 14a ♂, b ♀, 15a ♂, b ♀, *eurytanus* Fruh. (pl. 1, fig. 9, ♂) (= *rebilus* Fruh. **syn. n.** pl. 1, fig. 10, ♂, Seitz, pl. 141 g 4 ♀, 5 ♂) Borneo, *molionides* Fruh. (pl. 1, fig. 13, ♂) Bali, *bajanus* Fruh. Lombok, *aphocha* Kheil (pl. 1, fig. 11, ♀) Nias, and *enganicus* Fruh. (pl. 1, fig. 12, ♂) Engano. In the form *suku* Piepers & Snellen[3] the shining white underside has no striations and the usual markings are represented by reddish-grey spots : in a female of this form from Pahang (Bentong Forest Reserve, 770 feet 8.vi.1930, *A. S. Corbet*), the fore-wing post-discal spots, which increase in size towards the inner margin, are triangular and arranged in a regular curve with the apices towards the termen (wing expanse 22·5 mm.).

A. unicolor is the commonest member of the genus in Malaya and occurs from Pulau Langkawi to Singapore : it is uncommon on the hills, and the Selangor Museum has two males taken on Gunong Tahan, 6500–7100 feet, 12 and 14.xii.1921. In a long series of both sexes taken in Singapore by Messrs. Cowan and Eliot, the underside (pl. 1, fig. 4, ♂), is whiter than usual in Malaysian forms and exactly resembles the figure of *unicolor* in Seitz.

Allotinus dilutus sp. n.

♂. The fore-wing termen is slightly more rounded than in *unicolor* Feld. & Feld. ♂, from Malaya.

Upperside. Paler brown than *unicolor*, and resembling a worn specimen of that species. The brand is rather rectangular as in *unicolor* but smaller and contrasting less strongly with the paler ground.

Underside. Ground colour more reddish than in *unicolor*, and slightly shining. The markings, which are paler, fainter, and more reddish than in *unicolor*, are arranged as in that species, but the post-discal fasciae on both wings are distinctly linear and not composed of separated spots as is usual in *unicolor*.

Wing expanse 21·5 mm.

♀. *Upperside.* Paler brown than in *unicolor* ♀, and with a narrow, whitened, discal area on the fore-wing suggestive of the male brand.

Underside. Differs from *unicolor* ♀ as in the male.

Wing expanse 21 mm.

Male *holotype* and female *allotype*. MALAY PENINSULA : Selangor, Kanching, 21.ix.1930 (*A. S. Corbet*). In my collection.

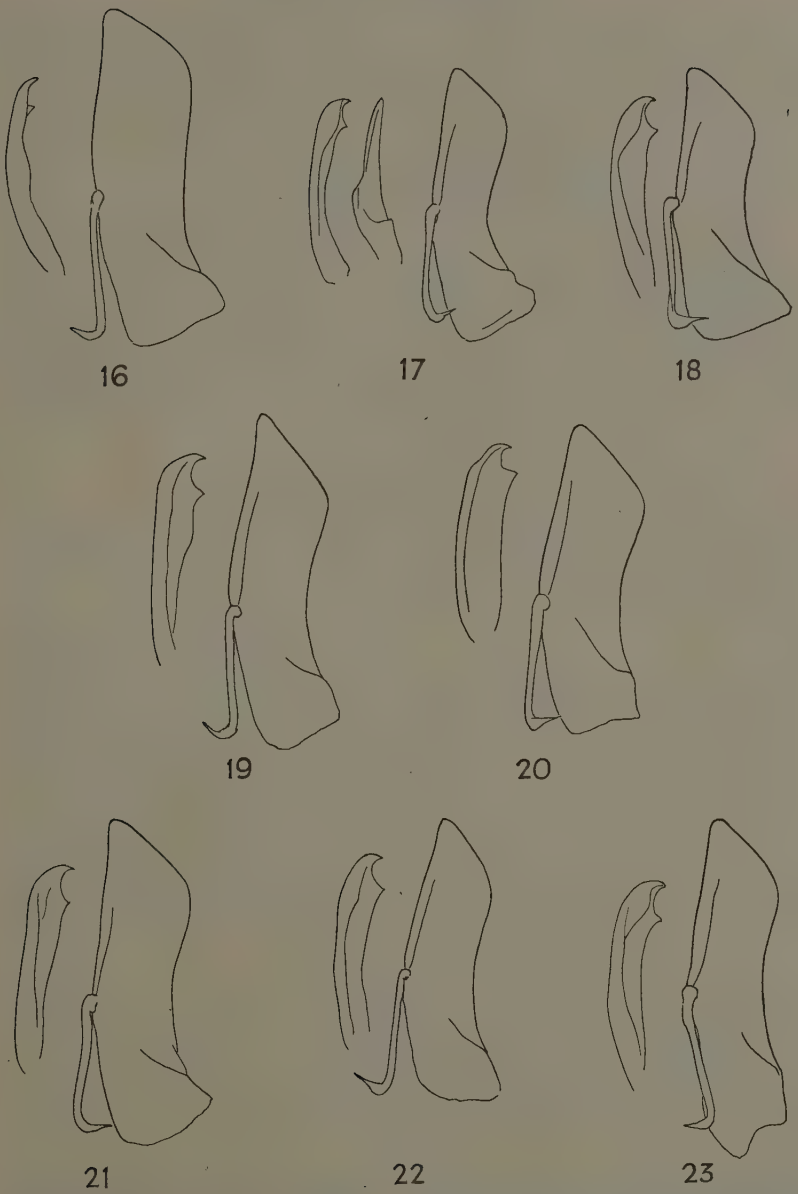
Also in my collection are one male and four females from Pahang (Bentong Forest Reserve) and two females from Selangor (Gombak Valley, 900 feet). I have examined also a male from Johore (Lombong, 3.vii.1938, *C. F. Cowan*) and a British Museum male from Burma (Ataran), *ex* Coll. Brigadier W. H. Evans. *A. dilutus* is evidently a rare species and apt to be overlooked on account of its similarity to *A. unicolor*, from which it is difficult to separate some females.

Allotinus apries eupalion Fruh.

Allotinus apries Fruhstorfer, 1913, *Z. wiss. InsektBiol.* **9**: 344; ♂♀, North Borneo. Figured in Seitz, pl. 141 g 9 ♂, 10 ♀.
Allotinus strigatus eupalion Fruhstorfer, 1914, *Z. wiss. InsektBiol.* **10**: 22; ♂♀, North-east Sumatra.
Allotinus strigatus eupalion Fruhstorfer, 1916, *in* Seitz, *Grossschmett. Erde* **9**: 813.

The species is known only from Malaysia and the nominotypical form has a more obscure fore-wing brand in the male than is the case with the sub-

[3] *Allotinus suku* Piepers & Snellen, 1918, *Rhop. Java.* **4**: 13, pl. xxvii, f. 181 ♀ *nec* ♂; Java.



FIGS. 16–23.—Male clasper and uncus of (16) *A. leogoron lindus* subsp. n., Malaya, holotype; (17), (19), (22) and (23) *A. unicolor unicolor* Feld. & Feld., Malaya; (18) *A. unicolor eurytanus* f. *rebilus* Fruh., Borneo, holotype; (20) *A. unicolor posidion* Fruh., Java, holotype; (21) *A. unicolor myriandus* Fruh., Sumatra, holotype. The aedeagus is shown also in figs. 15 and 17.

species *dositheus* Fruh. West Java, Piepers and Snellen, pl. xx, f. 17 ♂, and *eupalion* Fruh. North-east Sumatra. A female from Johore (36 miles north-west of Johore Bahru, 200 feet, 27.ii.1938, *C. F. Cowan*), with wing expanse 36 mm., agrees with a Sumatran female in the British Museum.

The female of *A. apries* differs from that sex of *A. horsfieldi* in the whitened discal area on the fore-wing above.

Allotinus continentalis vadosus subsp. n.

Allotinus horsfieldi continentalis Fruhstorfer, 1913, *Z. wiss. InsektBiol.* **9**: 344; ♂, Upper Burma, Bhamo. Figured in de Nicéville, 1890, *Butt. India, Burmah & Ceylon* **3**, pl. xxvi, f. 156.

The species *A. continentalis*, *A. horsfieldi* and *A. leogoron*, comprising the *horsfieldi* section of the *horsfieldi* group, are characterised not only by the markings on the underside, but by the long and narrow terminal point of the clasper: in *A. horsfieldi*, the uncus plate has a rostriform tip but it is blunted in *A. leogoron* (where it is short and stout), *A. continentalis* and *A. macassariensis* (Holl.). The last-named species (Seitz, pl. 141 h 10 und.) has a long and very narrow sex stripe in the male, quite unlike the long, very broad and prominent brand usually found in the Indo-Malayan species.

The Fruhstorfer Collection contained no males of *continentalis* and the holotype must be the specimen figured by de Nicéville.

The Malayan representative is rather rare and constitutes a new subspecies.

♂. *Upperside.* Resembles Malayan *A. horsfieldi* ♂, but the hind-wing is not crenulated.

Underside. Markings and striations as in Malayan *A. horsfieldi* ♂, but the fore-wing post-discal fascia more obscure and the submarginal streaks not as dark.

Wing expanse 36 mm.

Holotype. Malay Peninsula: Penang, ♂, 1895 (*Lakatt & Pamboo*). In British Museum, *ex* Coll. Oberthür. A male from Selangor (Ampang Forest Reserve, 24.viii.1930, *A. S. Corbet*) is nearer to *continentalis* Fruh. from Upper Burma, although the underside striations are darker and denser.

♀. *Upperside.* Resembles Malayan *A. horsfieldi* ♀, but the ground colour has a slightly yellower tinge, the discal area of the fore-wing and the tornal half of the hind-wing are paler and the fore-wing has an elongated discal streak, which is slightly whitened.

Underside. Ground colour whiter than in Malayan *A. horsfieldi* ♀, with markings and striations darker brown, the striations being less dense. The markings are arranged as in *A. horsfieldi* ♀, except that the fore-wing post-discal band is divided into three portions, that in spaces 4, 5 and 6 is very oblique, the band composed of elongated, conjoined streaks in spaces 2 and 3 is not as oblique and is directed towards the tornus, and the elongated streak in space 1b almost touches the submarginal streaks.

Wing expanse 35 mm.

Allotype. Malay Peninsula: Penang, ♀, 1895 (*Lakatt & Pamboo*). In British Museum, *ex* Coll. Oberthür.

In the British Museum, *ex* Coll. Fruhstorfer, are single females of *A. continentalis* from Sumatra and West Borneo.

Allotinus horsfieldi nessus subsp. n.

Miletus horsfieldi Moore, 1857, *in* Horsfield & Moore, *Cat. Lep. Mus. E. I. Co.* **1**: 19, pl. 1a, f. 2 ♂; ♂♀, Java.

Paragerydus horsfieldi Distant, 1884, *Rhop. Malay.*: 207, pl. xx, f. 7 ♂.

♂♀. Differs from the other Malaysian races of *A. horsfieldi* in the more reddish colour of the underside, the denser striations, the broader sub-basal, discal and post-discal spots, and the more prominent submarginal streaks.

Wing expanse 40 mm. in ♂, 33 mm. in ♀.

Malay Peninsula: Perak, i.–ii.1890 (*W. Doherty*). ♂ *Holotype* and ♀ *Allotype* in British Museum.

In addition to the large typical form, there occurs in the Malay Peninsula a second type of male with a more rounded fore-wing termen and a smaller brand. A series of 4 males and 4 females taken at Lombong in Johore during 1938 by Messrs. C. F. Cowan and J. N. Eliot are remarkable for the great disparity in size, the wing expanses being ♂♂ 24–35 and ♀♀ 21–30 mm. The male sex stripe in the Johore specimens is comparatively short and narrow and resembles that of *A. unicolor*. There appears to be no difference in the male genitalia of these divergent forms.

A. horsfieldi is practically confined to Malaysia, the remaining denominated subspecies being *permagnus* Fruh. (= *intricata* Fruh., *infumata* Fruh.), Sumatra, and *satelliticus* Fruh., Engano. The Bornean form is distinct and is rather intermediate between *permagnus* and *nessus*. The nominotypical form is figured in Piepers and Snellen, pl. xix, f. 12a ♂, b ♀. Specimens from Pulau Tioman are of larger size and, in the male, show a tendency for the post-discal spots on the underside to be more rounded.

Allotinus leogoron lindus subsp. n.

Allotinus leogoron Fruhstorfer, 1916, *in* Seitz, *Grossschmett. Erde* **9**: 811; ♂, Sumatra.

♂. Differs from *leogoron* ♂, of Sumatra and Borneo, in the darker and more densely striated underside, on which the post-discal fasciae appear less prominent. The fore-wing post-discal band is broken at veins 2 and 4 into three very oblique portions, the lower end of each almost touching the submarginal streaks.

Wing expanse 27 mm.

Holotype. Malay Peninsula: Perak, ♂, vii.–viii.1895 (*Lakatt & Pamboo*). In British Museum *ex* Coll. Oberthür. A male in my collection from Selangor (Kanching, 6.iv.1931, *A. S. Corbet*), and two males from Johore (Lombong, v.1938, *J. N. Eliot*) have also been examined.

I have not recognised the female of *A. leogoron* with absolute certainty, but the following specimen seems to agree with the male of *lindus* and to differ from a long series of Malayan *A. horsfieldi*.

♀. Both wings narrower and more elongated than in *A. continentalis* or *A. horsfieldi* ♀♀, and the hind-wing with long and pointed teeth.

Upperside. Uniform dark reddish-brown, with the fore-wing discal area only slightly paler.

Underside. Ground colour pale reddish-white, with striations less dense than in *A. horsfieldi nessus* ♀, and the narrower post-discal fasciae on both wings more clearly defined and comprising more rounded spots. As in the male, the fore-wing post-discal fascia is divided into three portions, the uppermost oblique, but not as oblique as in the male, the middle portion in spaces 2 and 3 more or less parallel with the termen and meeting the subapical part of the band at vein 4, and the spot in space 1 b more oblique and directed towards the inner margin. On the hind-wing, the post-discal spot in space 6 is moved in slightly and separated from the spot above in space 7.

Wing expanse 26 mm.

Allotype. Malay Peninsula: Selangor, Kuala Sleh, ♀, 25.viii.1929 (*A. S. Corbet*). In my collection.

A male of *A. leogoron* from the Langkawi Islands differs from the mainland form in the whiter colour of the underside and in the darker and more

prominent sub-basal, discal and post-discal markings: the same differences between mainland and Langkawi forms are shown by *A. taras* and *A. strigatus*.

Allotinus fabius arrius Fruh.

Paragerydus fabius Distant & Pryer, 1887, *Ann. Mag. nat. Hist.* (5) **19**: 266; ♀, Sandakan.
Allotinus fabius arrius Fruhstorfer, 1914, *Z. wiss. InsektBiol.* **10**: 22; ♀, North-east Sumatra.
Allotinus fabius arrius Fruhstorfer, 1916, *in* Seitz, *Grossschmett. Erde* **9**: 814, pl. 141 i 5 ♂ und.

The Malayan race of *A. fabius* is usually placed as *panormis* El., but the "male" holotype of the latter is a female of another species from East Pegu; the female allotype of *panormis* is an *A. fabius* form from the Malay Peninsula. *A. fabius* is a variable species, but a series from Malaya comprising 3 males and 3 females hardly differs from the Sumatran subspecies *arrius*.

In addition to the nominotypical form, further subspecies described from Borneo are *caudatus* Gr. Sm. (Kina Balu) and *pamiscus* Fruh. (South-east Borneo).

The male genitalia of *A. fabius* (fig. 4) and *A. punctatus* (Semp.), from the Philippines (fig. 1), are abundantly distinct and there can be no question of these insects being conspecific.

Allotinus taras taras (Doh.).

Paragerydus taras Doherty, 1889, *J. Asiat. Soc. Bengal* **58**: 437, pl. xxiii, f. 10 ♂; ♂♀, Tenasserim Valley.
Allotinus taras taras Fruhstorfer, 1916, *in* Seitz, *Grossschmett. Erde* **9**: 813.

This species has not been recorded from Malaya hitherto, but I have seen specimens from the Langkawi Islands, Perak, Selangor, Pahang, Negri Sembilan and Johore. Malayan specimens do not differ from typical *taras*. Other Malaysian subspecies are *battakanus* Fruh., North-east Sumatra (Seitz, pl. 141 g 7 ♀), *sarrastes* Fruh., North Borneo and *narsares* Fruh., West Java (Piepers and Snellen, pl. xix, f. 16 ♂).

A. porriginosus Tox.[4] was described from a pair taken *in copula* on the coast in West Java. It is stated that the male has a feebly indicated sex stripe (4 × 1 mm.) and that the length of the fore-wing is 16–17 mm. in both sexes. I have not been able to separate this species from *A. taras*.

Allotinus panormis fruhstorferi subsp. n.

Allotinus panormis Elwes, 1892, *Proc. zool. Soc. Lond.* **1892**: 619, pl. xliii, f. 8 ♀ *nec* ♂; East Pegu. (Figure 9 of the ♀ allotype represents an *A. fabius* subspecies from Perak.)

A. panormis appears to be confined to the mountains of Malaysia, and the Malayan form constitutes a new subspecies.

♂. Differs from Sumatran *maitus* Fruh. ♂ in the darker ground colour beneath, and in the finer but more obscure post-discal markings. Differs from Bornean *pyxus* (Nic.) ♂ in that the underside post-discal markings are more distinct and the black anteterminal spots on both wings are more obscure.

Wing expanse 31 mm.

Holotype. Malay Peninsula: Perak, ♂, i.–ii.1890 (*W. Doherty*). In British Museum *ex* Coll. Elwes. A Selangor Museum male from Pahang (Fraser's Hill, 4000 feet, 24.x.1933, *H. M. Pendlebury*) is remarkable for its wing expanse of 38 mm. A male from Perak (Maxwell's Hill, 4000 feet,

[4] *Allotinus porriginosus* Toxopeus, 1932, *Versl. Afd. Ned. Oost-Ind. Ned. ent. Ver.* **1**: lxxvii; ♂♀, West Java (Tjisolok, Wijnkoopsbaai).

18.ix.1929, *A. S. Corbet*) is similar to the type and all three males have the long, diffuse and obscure sex stripe characteristic of the species.

♀. Differs from the nominotypical ♀ in the greyer and more uniform underside, on which all markings are much fainter and paler, and the fore-wing subapical area is not deep russet red. Very similar to *taras* (Doh.) ♀, from Malaya and Burma, but differs in the slightly whiter underside with finer, although denser, striations in the distal half of the fore-wing: the post-discal fasciae are narrower and, on the fore-wing, form a regular curve, the cell-end streaks and sub-basal markings are much finer, and the black submarginal dots are not as prominent.

Differs from *pyxus* ♀ in the less dense striations and finer markings on the white underside.

Wing expanse 31 mm.

Allotype. Malay Peninsula: Pahang, Cameron Highlands, Tanah Rata, 4000 feet, ♀, 31.i.1930 (*A. S. Corbet*). In my collection. The Selangor Museum has females from Selangor (Bukit Kutu, 3300–3400 feet).

The Bornean race *pyxus* (Nic.) (= *waterstradti* (H. H. Drc.), *absens* (H. H. Drc.) is figured in Seitz, pl. 141 i 3 ♂ und., 4 ♀, and *portunus* (Nic.) Java, in Piepers and Snellen, pl. xx, f. 18a ♂, b ♀.

Allotinus strigatus malayanus subsp. n.

Allotinus strigatus Moulton, 1912, *J. Straits Br. roy. Asiat. Soc.* **6**: 80; Borneo (♂, Pulau Laut, ♀, Kuching).

Hitherto, this species was known only from Borneo, but the Fruhstorfer Collection contained a Sumatran male and, recently, Mr. J. N. Eliot, has discovered the species in Malaya.

♂. *Upperside.* The fore-wing brand (2 × 1·5 mm.) is smaller, more compact and not as white as in *strigatus* Moult.

Underside. Ground colour pale yellowish-brown, browner than in *strigatus* ♂; the arrangement of markings similar, but the comma-like spots comprising the post-discal fasciae are arranged in a more regular series.

Wing expanse 31 mm.

Holotype. Malay Peninsula: Johore, Kota Tinggi, ♂, 6.ii.1938 (*J. N. Eliot*). In my collection.

♀. *Upperside* as in *strigatus* ♀, while the *underside* differs in the less dense striations and in the narrower and more clearly defined post-discal fasciae.

Wing expanse 32 mm.

Allotype. Malay Peninsula: Selangor, Bukit Kutu, 1500 feet, ♀, 4.vi.1937 (*J. N. Eliot*). In British Museum. Other females examined from the Langkawi Islands, Selangor and Johore.

The Selangor Museum has a pair of *A. strigatus* (the male without an abdomen), from Pulau Tioman, with wing expanses ♂ 36 mm. and ♀ 34 mm. The specimens differ from the Bornean and the Malayan forms in the paler ground colour of the underside and in the more broken post-discal fasciae on both wings.

Allotinus strigatus denalus subsp. n.

The Sumatran race is denominated *A. strigatus denalus*.

♂. Sex stripe on the fore-wing above slightly narrower and shorter than in *strigatus* ♂.

Underside. Ground colour pale reddish-white, with the ochreous tinge paler than in

strigatus ♂. The fore-wing apical third darkened somewhat but the termens are not broadly darkened as in the Bornean form, the rusty red border being barely 0·5 mm. wide. Markings as in *strigatus* ♂, but narrower and fainter.

Wing expanse 37 mm.

Holotype: Sumatra (E. M. B.), ♂, iii.1894. In British Museum *ex* Coll. Fruhstorfer. Unique.

Allotinus borneensis elioti subsp. n.

Allotinus borneensis Moulton, 1912, *J. Straits Br. roy. Asiat. Soc.* **6**: 81; ♂♀, Sarawak.

The underside of the nominotypical form is figured in Seitz, pl. 141 i 6 ♂ as "strigatus."

♂. Resembles *borneensis* Moult. ♂.

Wing expanse 37 mm.

Holotype. Malay Peninsula: Johore, Kota Tinggi, ♂, 13.ii.1938 (*J. N. Eliot*). In my collection.

♀. *Upperside* as in *borneensis* ♀.

Underside. Greyish-white (not deep reddish-white) with the fore-wing broadly shaded with rusty red in the apical third. Both wings with rusty red distal bordering about 1 mm. broad, otherwise the hind-wing is not darkened. Markings exactly as in *borneensis* ♀, the outwardly whitened black submarginal dots being particularly prominent, and the hind-wing strongly caudate at vein 4 as in the nominotypical form ♀.

Wing expanse 35 mm.

Allotype. Malay Peninsula: Johore, Lombong, ♀, 8.v.1938 (*J. N. Eliot*). In British Museum. A Selangor Museum female from Selangor (Bukit Kutu 3400 feet, 1.viii.1915), with wing expanse 39 mm., has a paler underside and closely resembles a British Museum female from Sumatra (Siboga expedition, ii.1903, *ex* Coll. Oberthür), with wing expanse 36 mm.

During the present investigation, the types of all the *Allotinus* forms described by Fruhstorfer mentioned in this paper, except *continentalis*, have been examined: other *Allotinus* types in the British Museum are *horsfieldi* (Mre.), *nicholsi* Moult., *strigatus* Moult. and *unicolor* Feld. & Feld., and I am indebted to the Trustees of the British Museum (Natural History) for permission to study these types.

I am deeply grateful to Mr. H. M. Pendlebury, Director of Museums, F.M.S., for the loan of the whole of the *Allotinus* material in the Selangor Museum, and to Messrs. C. F. Cowan and J. N. Eliot for the opportunity to examine *Allotinus* specimens recently collected by them in southern Malaya. I am also indebted to these gentlemen and to Mr. N. D. Riley for constructive criticism.

Malayan species of *Allotinus*.

ENGRAVED BY STAR ILLUSTRATION, LONDON.

Explanation of Plate 1.

Fig. 1. *Allotinus paetus* (Nic.), ♂, North-east Sumatra.
2. *A. unicolor atacinus* Fruh., ♀ holotype, Burma.
3. *A. unicolor unicolor* Feld. & Feld., ♀ holotype, Singapore.
4. *A. unicolor unicolor* Feld. & Feld., ♂, Singapore.
5. *A. unicolor myriandus* Fruh., ♂ holotype, Selesseh, Sumatra.
6. *A. unicolor myriandus* Fruh., ♀ allotype, Selesseh, Sumatra.
7. *A. unicolor posidion* Fruh., ♂ holotype, Central Java.
8. *A. unicolor posidion* f. *enatheus* Fruh., ♀ allotype, West Java.
9. *A. unicolor eurytanus* Fruh., ♂ holotype, Sintang, Borneo.
10. *A. unicolor eurytanus* f. *rebilus* Fruh., ♂ holotype, Sintang, Borneo.
11. *A. unicolor aphocha* Kheil, ♀, Nias.
12. *A. unicolor enganicus* Fruh., ♂ holotype, Engano.
13. *A. unicolor molionides* Fruh., ♂ holotype, Bali.

Undersides shown and all specimens enlarged, the linear magnification being × $1\frac{1}{3}$.